

## **Description of May 21, 2003, Socioeconomic Presentation Maps**

### **Study Area**

This map was created using data from the Arizona Land Resource Information System (ALRIS). A statewide file for incorporated city boundaries was clipped to the study area. The city boundary file available through ALRIS is updated on a regular basis to reflect changing city boundaries.

*Data source: ALRIS*

### **Projected Population Growth 2000 – 2018**

This map was created using a population growth model based on the Arizona Department of Economic Security's (DES) general description of their growth model and was written in the Arc Macro Language (AML). Readily available 2000 U.S. Census and Immigration and Naturalization Service (INS) data were used as model inputs. The data is displayed by tract; increase in persons per square mile.

### **Projection method:**

The model was run at the census tract scale. In the 2000 Census data, each tract had population totals broken down by sex and five-year age groups, or cohorts. At one year time-steps each cohort population was modified by death rate, foreign immigration rate, U.S. migration rate and aging (20% subtracted from one cohort and added to the next highest in age). Additionally, births rates were applied to female cohorts of the right age and the total was added to the lowest age cohort, divided among males and females according to the U.S. averages. The rates themselves did not change from one time-step to the next. The model needed little calibration, but was adjusted slightly to match DES model results at three validation points.

Ideally, each census tract would have unique values, by cohort, for each of the four main factors (birth, death, migration, immigration). Each tract would also have a built-in limit to the population based on zoning and other factors. Limited by timeframe (less than a week) and resources (free and readily available data only), this was not the case. The different factors available had differing data scales and cohort divisions:

**Birth rates:** Available at the county level by cohort. Each tract was given a set of rates based on its county.

**Death rates:** Available at the county level by age cohort only. Death rates by sex were at the national level. Death rates were calculated for the age cohorts of both sexes then split by sex according the national rate and assigned to tract by its county.

Immigration rates: Available at the state level by age cohort and, independently, by sex. Processed in the same fashion as death rates.

Migration rates: Available at the regional (western U.S.) level by age cohort and, independently, sex. Processed in a similar fashion to death rates except that the Tract assignments were statewide.

*Data Sources: U.S. Census Bureau digital GIS file, Immigration and Naturalization Service, Department of Economic Security.*

### **Percent Commercial per Square Mile**

This map was created using data from Maricopa Association of Governments (MAG), the City of Payson, and Yavapai County.

The City of Payson map used data from November 27, 2002, and was digitized manually using USGS township, range, and section lines as a reference. These lines are present on the hardcopy map, as well as in digital format. The City of Payson had a single "Commercial" zoning category designated. This category is shown on the map.

MAG data used was a digital Land Use file for the year 2000. All commercial land use categories were mapped – this included Specialty, Neighborhood, and Community Commercial land use.

Yavapai County provided a digital map, and this was queried for commercial zoning and extracted directly into the map. Categories of Commercial zoning from Yavapai County included Neighborhood, General Sales and Service and Minor Industrial Commercial.

Because of the fragmentary nature of the commercial polygons and the disparity between the extent of the mapped area and the size of the polygons, an alternate method of display was devised. Firstly, the data were converted to a 100-foot resolution continuous surface representation, or a 'grid.' Secondly, a square moving window one square mile in area was systematically passed over the grid, summing the number of commercial grid cells and assigning the value to the cell at the window's center. Finally, the cell values were divided by the number of cells in a square mile, resulting in a surface showing the percentage of commercial territory surrounding any point on the map.

*Data Sources: MAG 2000 Landuse digital GIS file, Yavapai County Zoning digital GIS file, Payson Zoning hardcopy map*

## **Percent Employment per Square Mile**

This map was created using data from Maricopa Association of Governments (MAG), the City of Payson, and Yavapai County.

The City of Payson zoning map, last updated November 27, 2002 was digitized manually using the township, range, and section lines as a reference, since these were present on the hardcopy map as well as in digital format from the USGS (United States Geological Survey). The Payson zoning map clearly indicates "Employment Centers" in Payson and thus, this is the category of data mapped for Payson.

MAG data used was a digital employment file for the year 2000. Employers are mapped by point location and include information regarding the number of employees for each site.

A Yavapai county zoning digital file was also used and categories for Commercial and Industrial land use were used to map Employment Regions. There was not an "office" category available in the Yavapai County zoning dataset.

The definition of a core employment region used to transform employer point clusters to areas was at least three employers within 500 feet of each other. This allowed the creation of triangle-shaped polygons using Delaunay triangulation. More than one contiguous triangle was formed where there were clusters of more than three points, which was almost always the case. At this point, the method used to visualize the commercial data was applied to the employment data.

Because of the fragmentary nature of the employment polygons and the disparity between the extent of the mapped area and the size of the polygons, an alternate method of display was devised. Firstly, the data were converted to a 100-foot resolution continuous surface representation, or a 'grid.' Secondly, a square moving window one square mile in area was systematically passed over the grid, summing the number of employer grid cells and assigning the value to the cell at the window's center. Finally, the cell values were divided by the number of cells in a square mile, resulting in a surface showing the percentage of employer territory surrounding any point on the map.

*Data Sources: MAG 2000 Landuse digital GIS file, Yavapai County Zoning digital GIS file, Payson Zoning hardcopy map*

## **ADOT Traffic Projections:**

This was obtained directly from ADOT to be used with the following stipulations:

The scope of coverage of these data have three limitations...

- 1) They includes only those routes of the Arizona State Highway System (those on which ADOT has jurisdiction over),

- 2) forecasts are only available for rural, non-urbanized portions of those routes, and
- 3) the forecasts only go out 20 years from the latest year ADOT has current volumes.

Conversion of this file was made from point to line by the following method:

This map uses traffic volume data from the Arizona Department of Transportation and major roads of Arizona from ALRIS.

The ADOT average annual daily traffic data was assigned to points, while easy visualization of the data required that it be assign to lines (roads). There were four processing steps:

- 1) Segmented the roads layer into one-mile segments. This is the effective resolution of the data.
- 2) Extracted the line segment endpoints (nodes) as points with its source line segment ID number as an attribute.
- 3) Performed a one-to-many spatial proximity join between the ADOT points and the extracted segment endpoints.
- 4) Join the endpoint data table to the segmented roads data table based on the segment ID number.

*Data source: ADOT digital GIS file, ALRIS digital GIS file*

#### **Pinal County Traffic Projections:**

This map was created from data available from the Pinal County Transportation Plan 2000 Update. The map depicts change for Annual Average Daily Traffic Counts for Pinal County from 2005-2020.

*Data source: Lima and Associates digital GIS file*

#### **MAG Traffic Projections:**

According to MAG: the map depicted here is based on draft preliminary estimates of emissions and have not been used in any Air Quality Plan adopted by MAG. They are subject to change. These traffic volume projections are for the year 2015 and are shown by Annual Average Daily Traffic Counts.

*Data Source: MAG digital GIS file*

#### **Current and Future Residential Land Use:**

This map was created using data obtained from the City of Payson, Yavapai County, and MAG.

The Payson zoning data was manually digitized from a hardcopy zoning map, using USGS township, range, and section lines as a guideline. Only the residential zones are shown on this map, in red.

Yavapai County provided its zoning data in a digital format, which was then queried to extract the residential zones, which are shown in red.

Two datasets from MAG were used for this map. The first was land use for the year 2000, and residential land use was extracted and is shown in red. Second, a dataset that showed platted subdivisions was used. Platted subdivisions are shown in blue, indicating development that will take place in the near future, or perhaps is already taking place. Platted subdivisions have been through the planning process and are approved to be built.

*Data Sources: MAG 2000 Landuse digital GIS file, Yavapai County Zoning digital GIS file, Payson Zoning hardcopy map*

#### **Land Ownership:**

The base layer of this map is a land ownership file created by ALRIS. This map shows privately owned land, along with state and federally owned lands. This map is included mainly to illustrate that future growth is quickly filling up remaining privately held land.

*Data Source: MAG 2000 Landuse digital GIS file, Yavapai County Zoning digital GIS file, Payson Zoning hardcopy map, ALRIS digital GIS files*

#### **MAG General Plan:**

The Future Land Use coverage was created by MAG by aggregating data from their draft General Plan Land Use coverage into condensed categories. Therefore, this coverage contains some General Plan data along with some draft General Plan data and conceptual plans. This map does not depict data for any particular year – just for the future, in general.

*Data Source: MAG digital GIS file*

#### **Yavapai County General Plan:**

This map was created by using a digital GIS file supplied by Yavapai County. The file represents a generalization of future land use and currently Yavapai County is working on several Community Plans that go into greater detail.

*Data Source: Yavapai County digital GIS file*

#### **Pinal County General Plan:**

This map was created by using a graphic file provided by Pinal County Planning Department. The .jpg was georeferenced, and then heads-up digitized. The Pinal County General Plan is currently in draft format, and available for review.

*Data Source: Pinal County .jpg file*

**Gila County General Plan:**

This map was created from a hardcopy of the Draft General Plan made available for review by Gila County. The map was scanned and the area was shown in relation to where it lies in Gila County.

*Data Source: Gila County General Plan hardcopy document*

**Generalized General Plan:**

This map was created by combining and generalizing land use shown in the Maricopa, Yavapai, and Pinal County general plans. Categories of land use were aggregated into seven basic categories for Residential, Commercial/Mixed Use/Office, Industrial, Open Space, Incorporated, Indian Reservation, and Rural.

*Data Sources: MAG digital GIS file, Yavapai County digital GIS file, Pinal County .jpg file, Gila County General Plan hardcopy document*